

2005

Habitat Trails . . . a manual for affordable green neighborhood development

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...a manual for affordable green neighborhood development

December 2005

University of Arkansas

Community Design Center an outreach center of the school of architecture

Fayetteville, Arkansas

<http://uacdc.uark.edu>



Debby Wieneke, Executive Director
Bill Adams, Development Coordinator

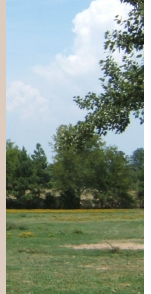
Habitat Trails Committee

Pat Adams, *Adams Excavation*
Mark Boyer, *UA*
Susan Brockway, *Tyson Foods*
Christopher Crossland, *Crossland Construction*
Larry Eaton, *PB2 Architects*
Terry Franklin, *XNA Regional Airport*
Gary Geiser, *PRG Inc.*
Steve Glass, *City of Rogers*
Stephen Luoni, *UACDC*
John Mack, *JKJ Architects*
Ken Mangold, *JB Hunt*
Marty Matlock, *UA*
Bob Morgan, *Beaver Water District*
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Rick Twist, *Arvest Bank*
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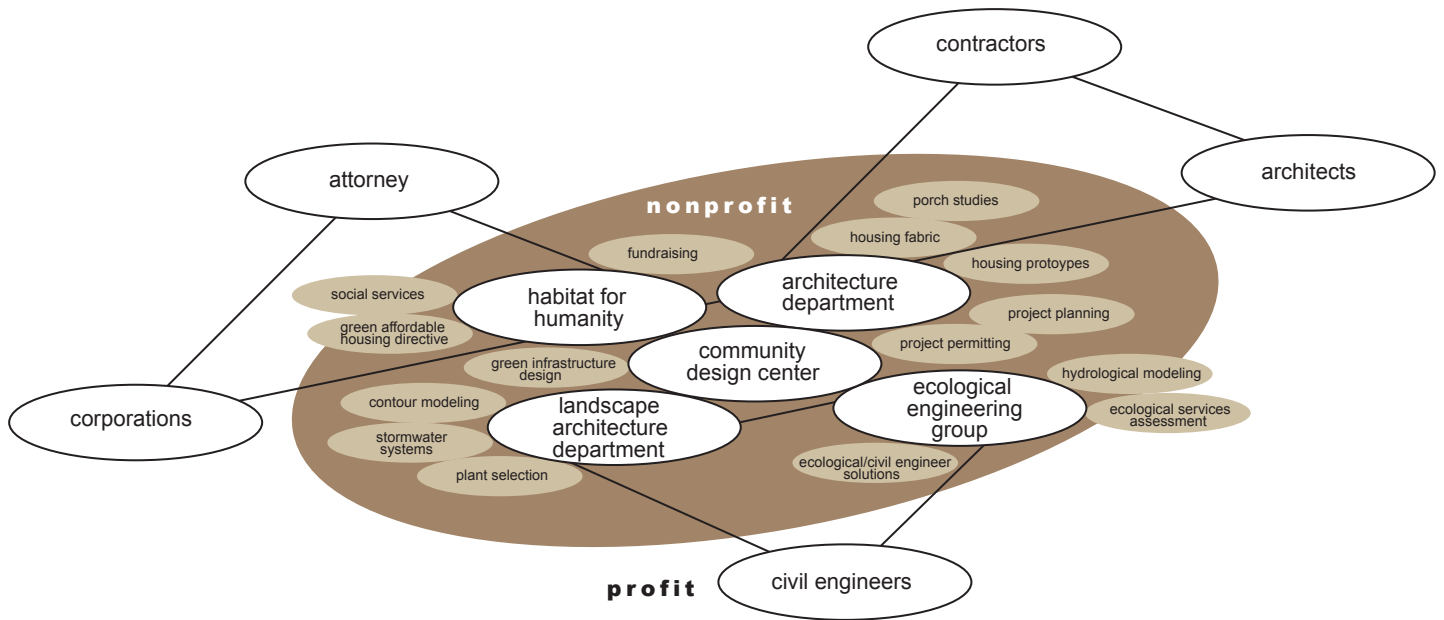
John Mack, AIA, NCARB

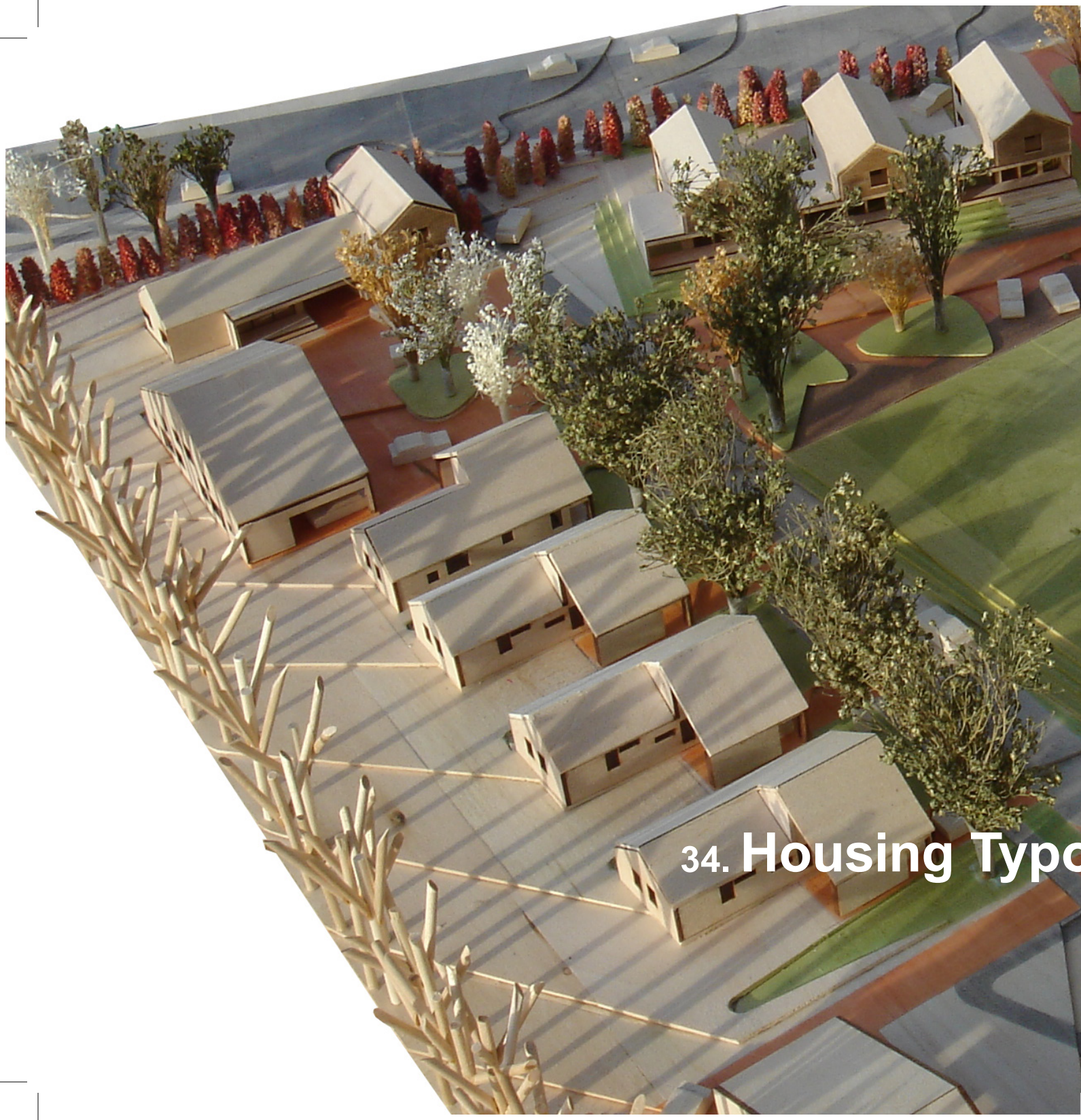
Crossland Construction

Christopher Crossland, VP

Adams Excavation

Pat Adams, Owner





34. Housing Type

An architectural model of a sustainable development project. The model features a central residential area with two houses, a large green lawn, and a series of terraced green spaces. A network of paths and streets is visible, along with various trees and landscaping elements. The model is set against a white background.

07. Executive Summary

08. Porch Interface

09. Site Plan

10. Project Components

12. Open Space Solution

18. Hydrological Solution

20. Side Yard Development Code

22. Green Street Development Code

28. Green Streets Solution

ologies

Habitat Trails is an eco-friendly affordable neighborhood development consisting of 17 homes. The development incorporates a range of conservation planning strategies supportive of unit clustering that preserves more than one third of the site as open space.



Executive Summary

Parks, Not Pipes

Developed land, including new park space for the City of Rogers, is designed to work in accord with the site's existing hydrological drainage, catchment, and recharge patterns. Stormwater runoff generated by new development will be retained and treated through a contiguous network of bioswales, infiltration trenches, stormwater gardens, sediment filter strips, and a constructed wet meadow. This exceeds the minimum requirement to simply detain runoff which has negligible treatment capability. The integration of a constructed treatment landscape with open space substitutes an ecologically-based stormwater management system for the expensive curb-gutter-pipe solution in civil infrastructure. Water is treated as a resource rather than a hazard.

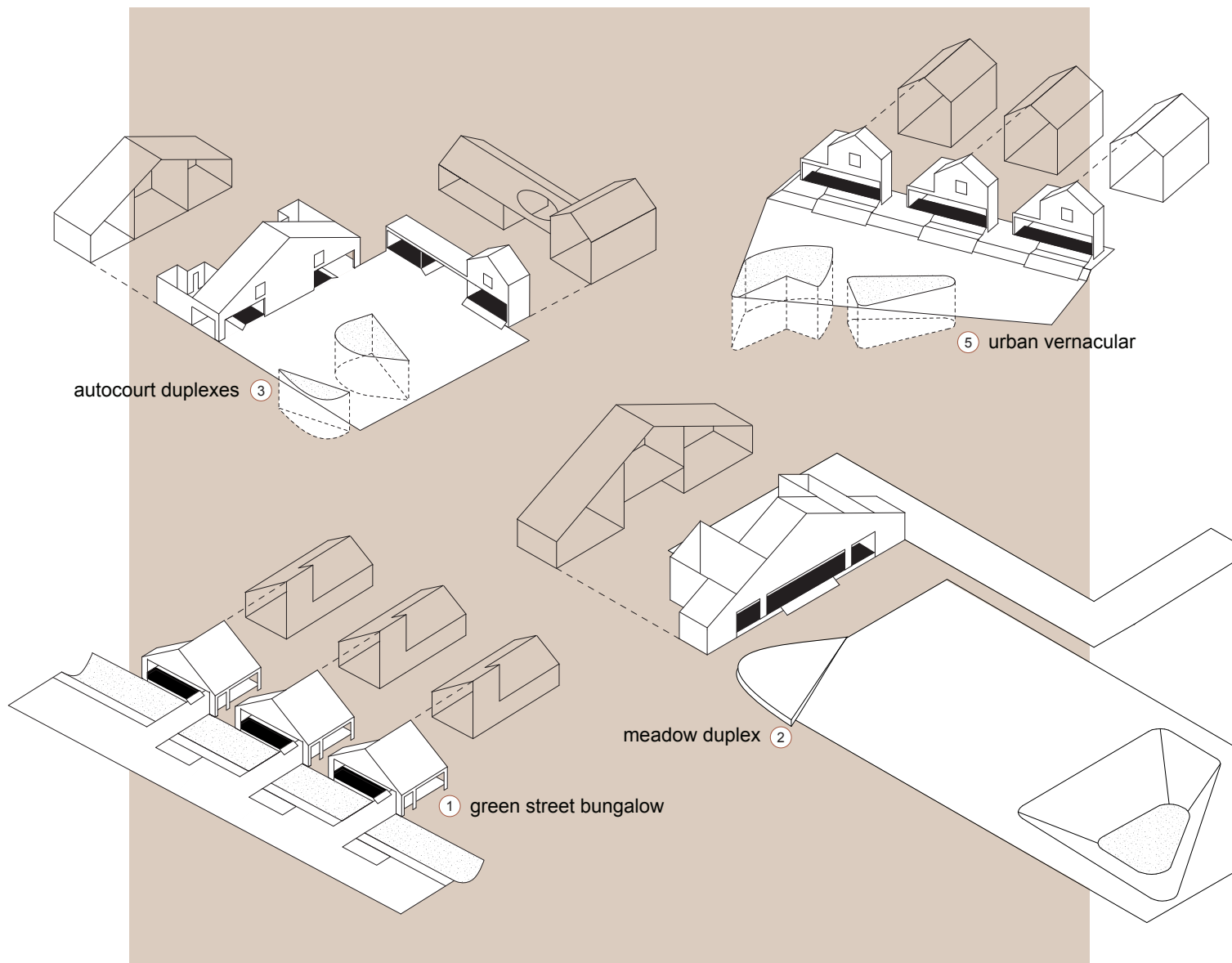
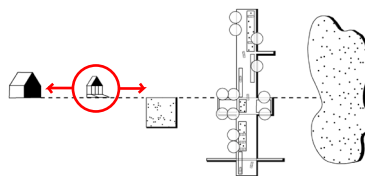
Green Streets Maximizing Ecological and Urban Services

Ecological stormwater management solutions are more effective than civil solutions based on economic, environmental, and social measures. While curb-gutter-pipe systems transport and concentrate runoff problems elsewhere, ecologically-based solutions use the landscape to absorb and treat runoff in-situ at half the cost. Ecological management solutions enhance water quality beyond the minimum detention requirements, dissipate peak flows to prevent flooding, and provide erosion and sediment control, while being less prone to the failures common in civil runoff catchment infrastructure. The collateral benefits of ecological solutions include enhanced neighborhood aesthetics, additional passive recreational assets, and provision for wildlife habitat. Contrary to civil "pipe and pond" solutions that separate ecological and urban services, the street is integrated with the landscape to become part of a larger watershed solution.

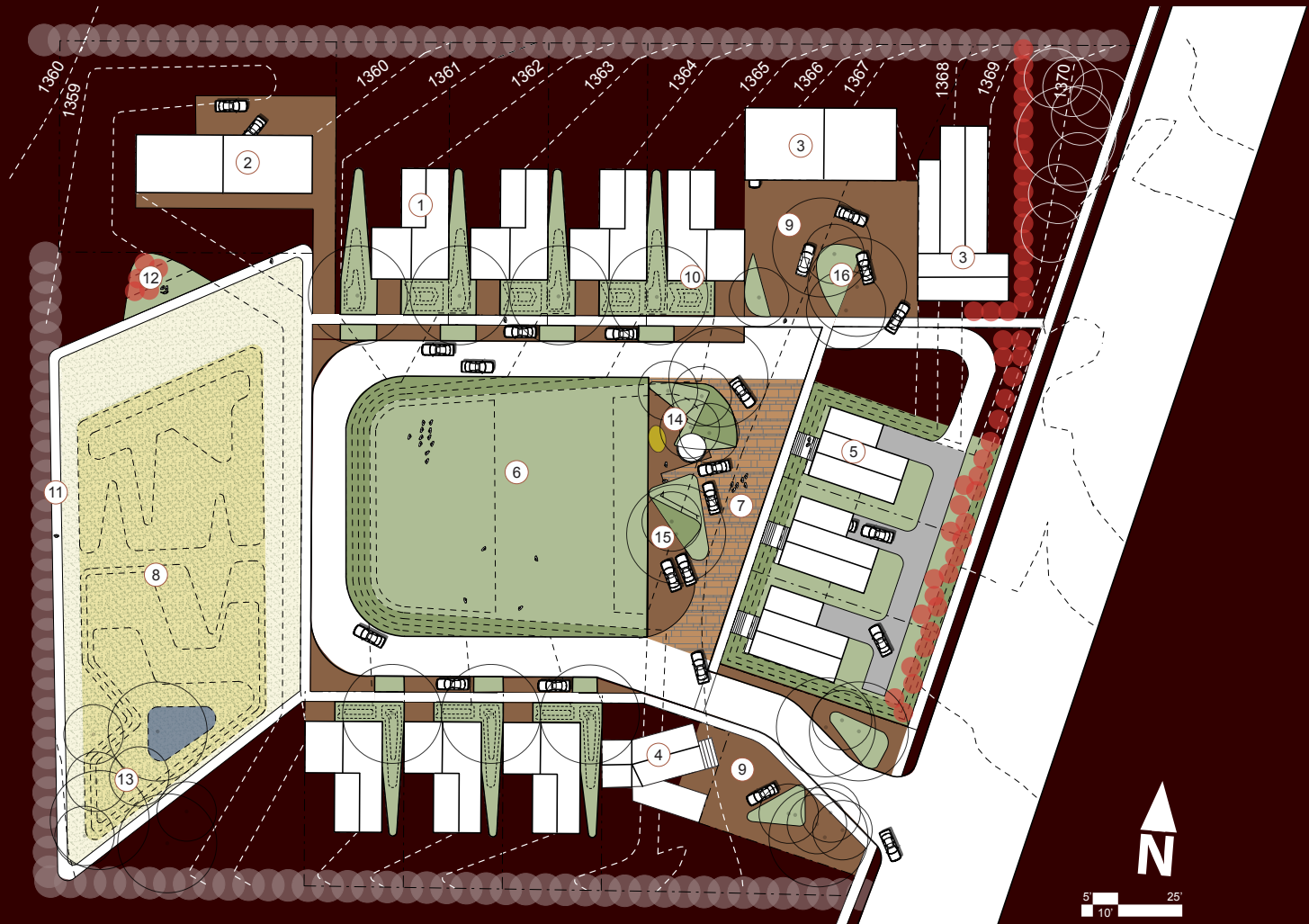
Porches Between House and Neighborhood

Streets are designed as landscapes to calm vehicular traffic and provide stormwater management functions. Their dimensions follow "skinny street" programs for residential areas recommended by the Congress for New Urbanism and implemented by municipalities nationwide. By decreasing street widths and installing pervious materials like grasscrete for parking strips, green streets minimize costly, impervious pavement while dampening unsafe motorist speeds (width is the major variable effecting speed, not geometry—curved or straight). Especially for children, residential streets can once again be safe and attractive for pedestrian activity without inhibiting emergency vehicle access. Elimination of raised curbs, gutters, and pipes in conventional runoff catchment infrastructure relieves the city of a significant maintenance obligation, allowing a contiguous system of rainwater gardens and bioswales along right-of-ways to absorb and treat runoff. Vegetated stormwater landscapes project a unique neighborhood character and visually link house porches and street. Since all homes feature a generous porch, setbacks are minimized to facilitate opportunities for neighborly interaction. Low impact residential development not only achieves affordability, but also allows for creative project design that stewards first-time buyers in all aspects of responsible home ownership. This also becomes a model for achieving high quality residential development in the City of Rogers.

porch interface



as the interface between public and private, urban and architectural, it is the porch, rather than the house, that holds the greatest promise for recapturing the art of good neighborhood design.



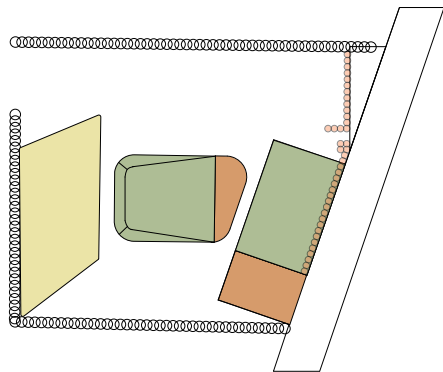
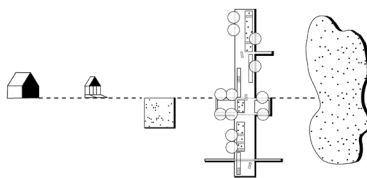
- 1 bungalow
- 2 meadow duplex
- 3 autocourt duplex
- 4 entry court house

- 5 urban vernacular
- 6 lawn
- 7 neighborhood plaza
- 8 wet meadow

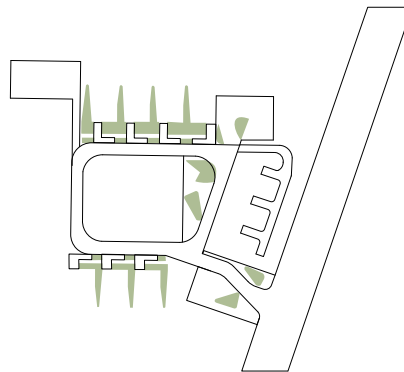
- 9 auto court
- 10 bioremediation swales
- 11 walking trail
- 12 recreation mound/water diverter

- 13 new tree stand
- 14 gazebo/playground equipment
- 15 infiltration trench
- 16 stormwater gardens

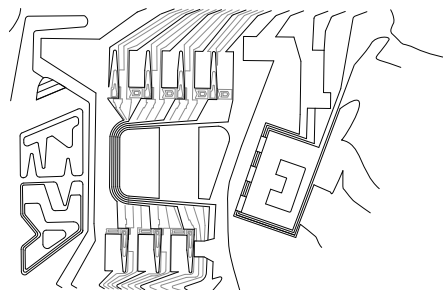
project components



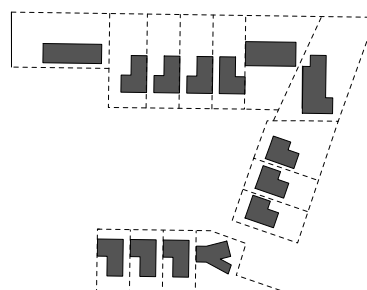
Open Space Solution



Green Streets Solution



Hydrological Solution

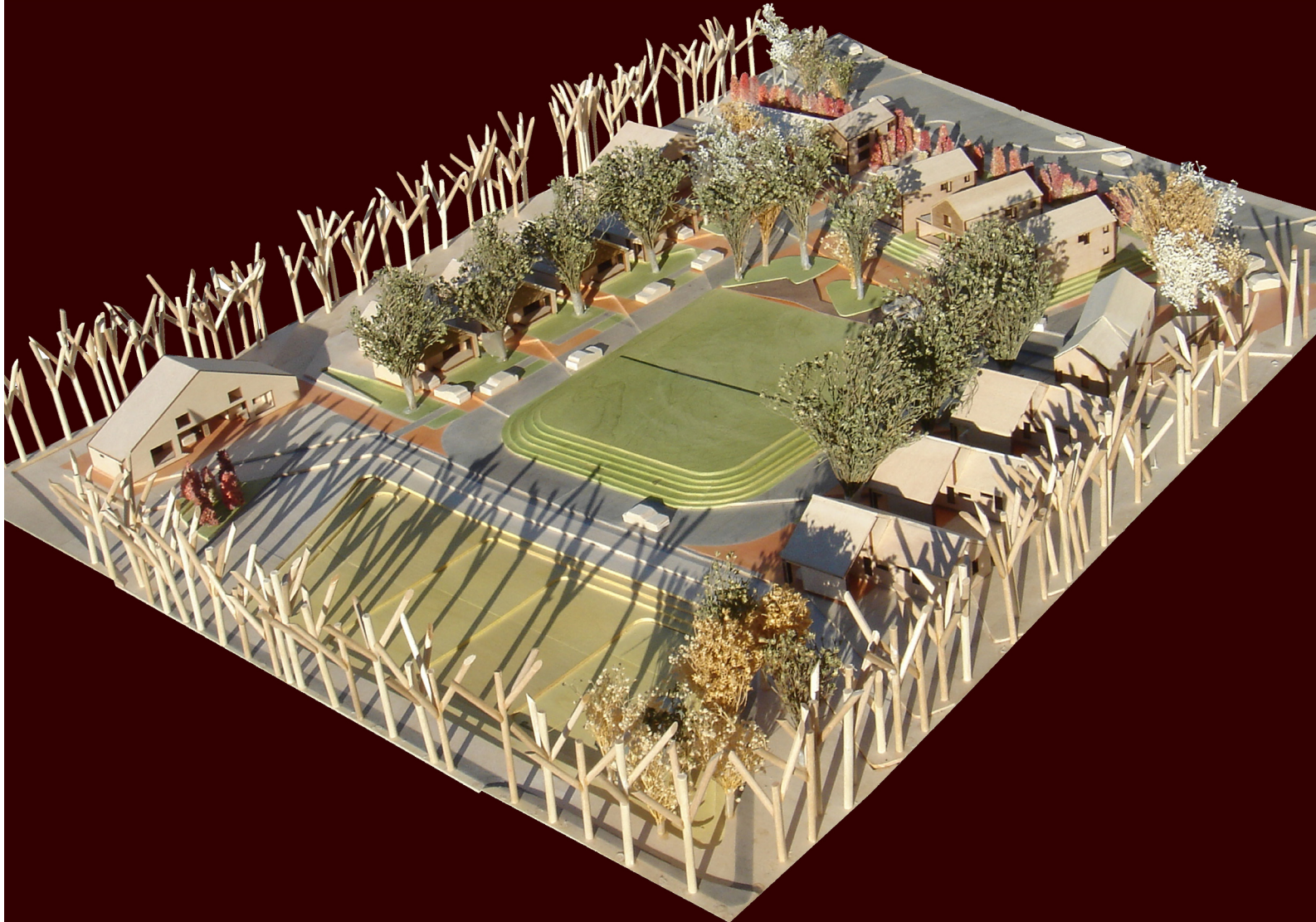


Housing Typologies



“... a good solution in one pattern preserves
the integrity of the pattern that contains it.”

Wendell Berry, “**Solving for Pattern**” in *The Gift of Good Land*



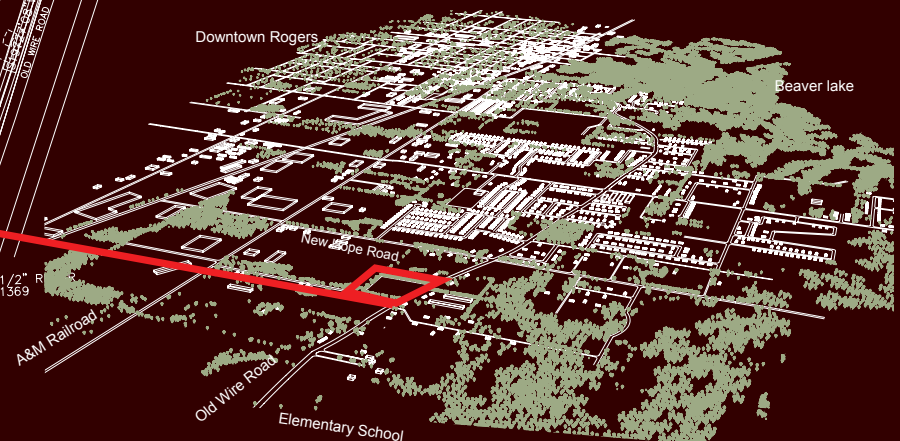
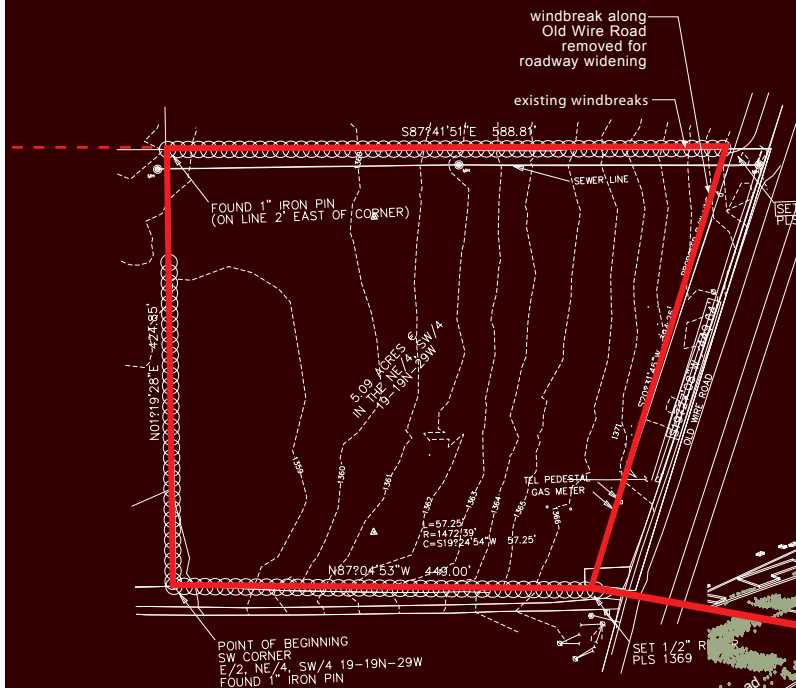


Alternative Green Neighborhood

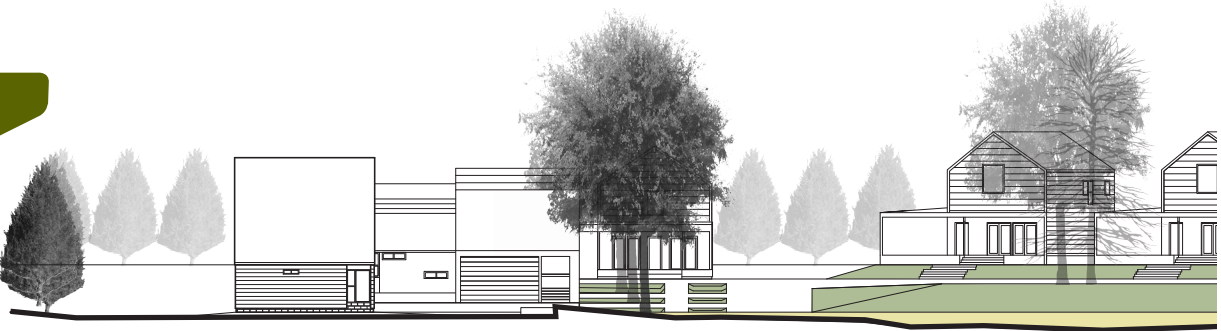


Conventional Subdivision Development

conservation planning pools otherwise private resources to create a shared neighborhood landscape. the amenity-rich neighborhood is the most cost-effective way to build home value.



open space
solution

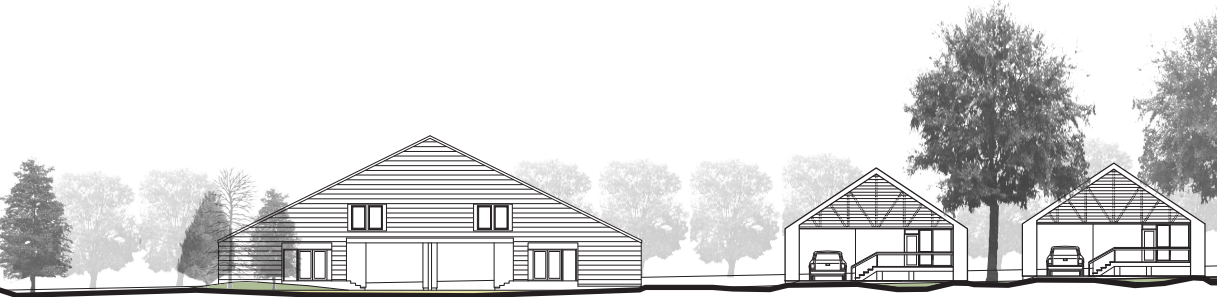


|Conveyance|
|Bioswales|

|Neighborhood|



|Neighborhood|



|Meadow|

|Conveyance|



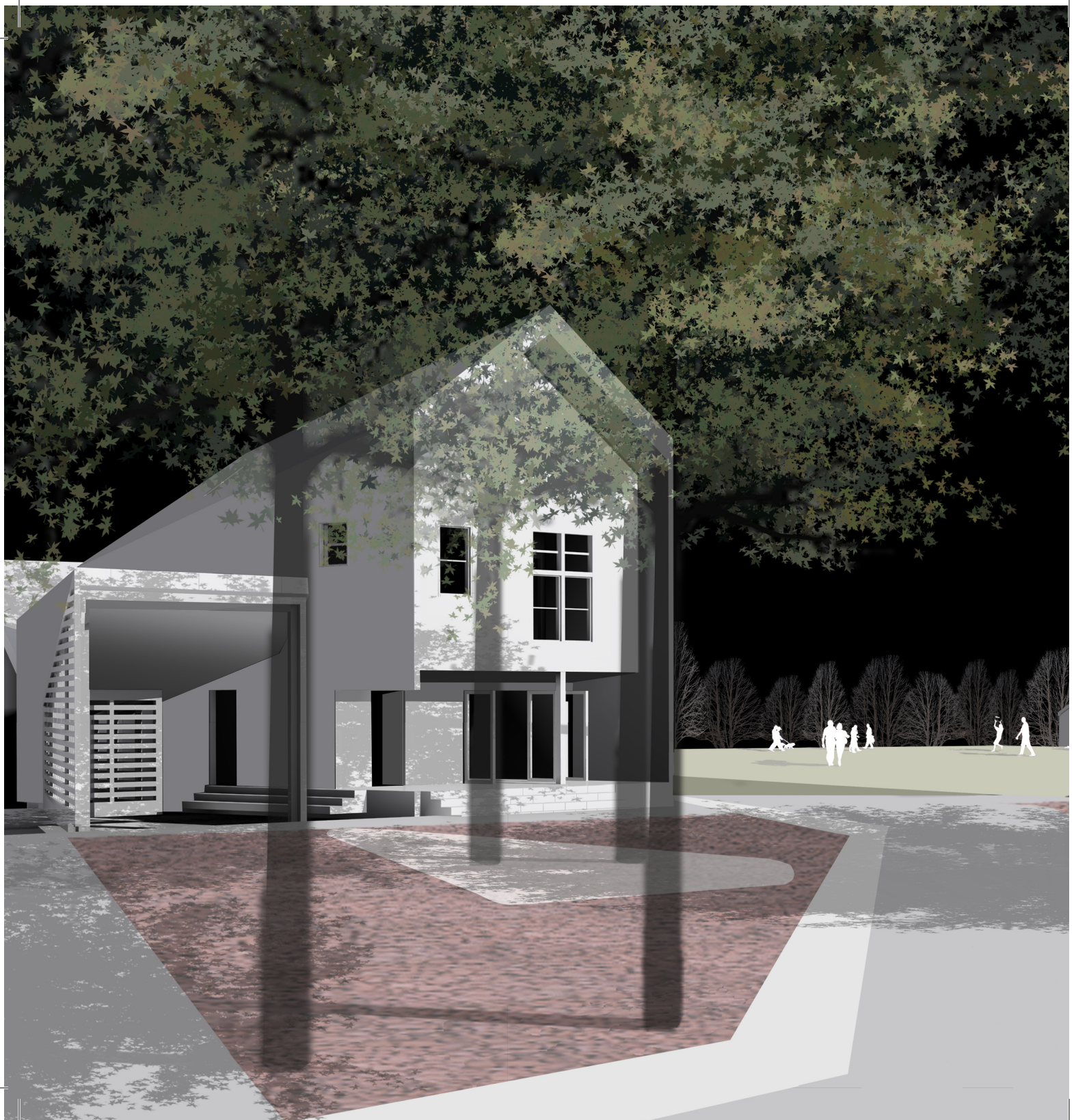
d Lawn | Conveyance |
Bioswales



erhood Lawn | Meadow |

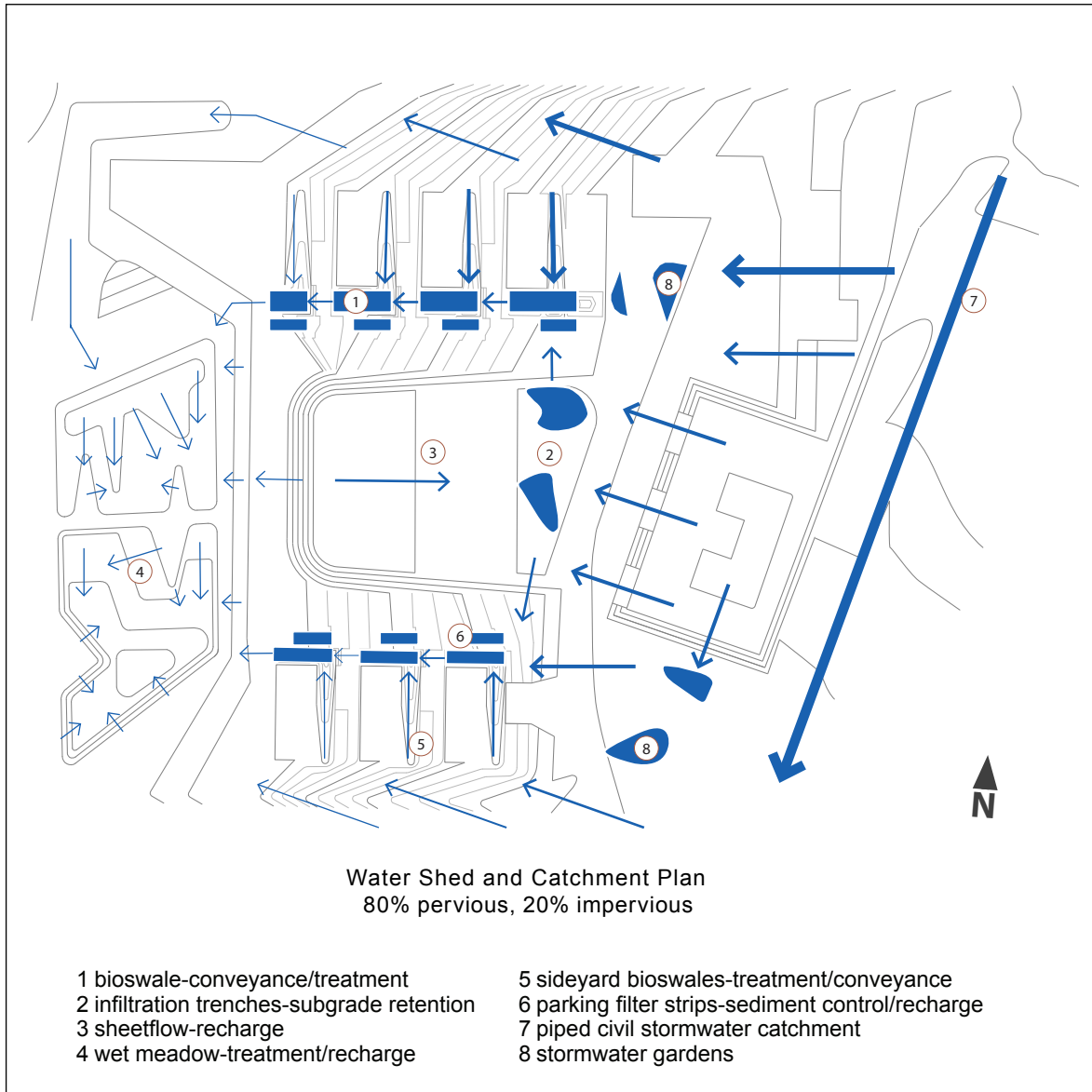
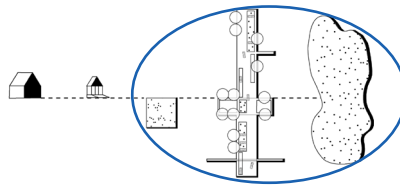


e Bioswales | Autocourt |



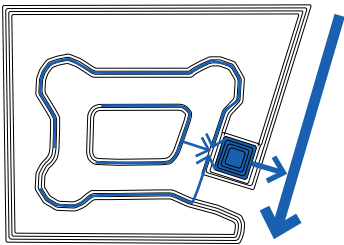
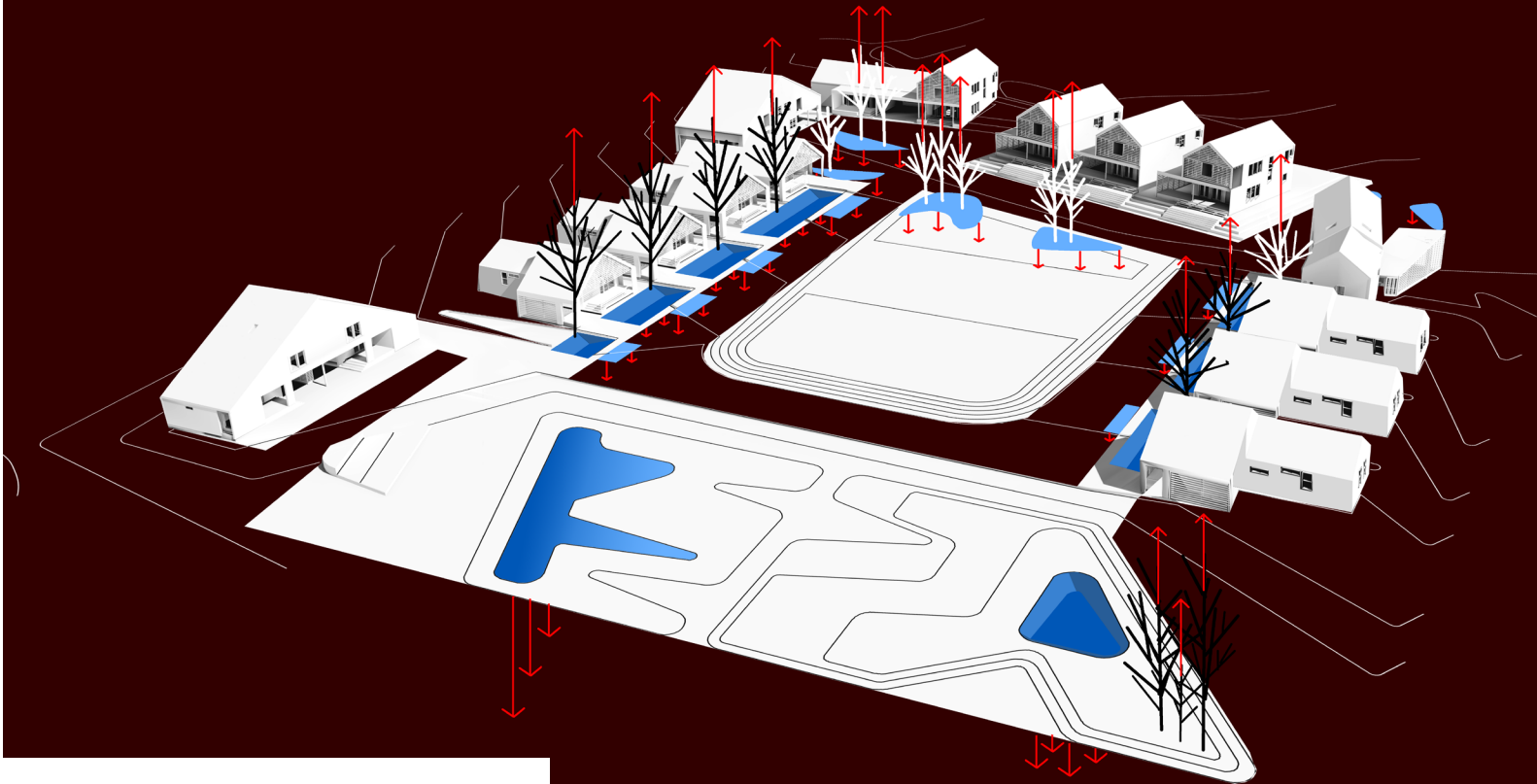


hydrological solution



parks, not pipes

planning incorporates the stormwater system into neighborhood landscape, bypassing the need for costly civil engineering solutions.



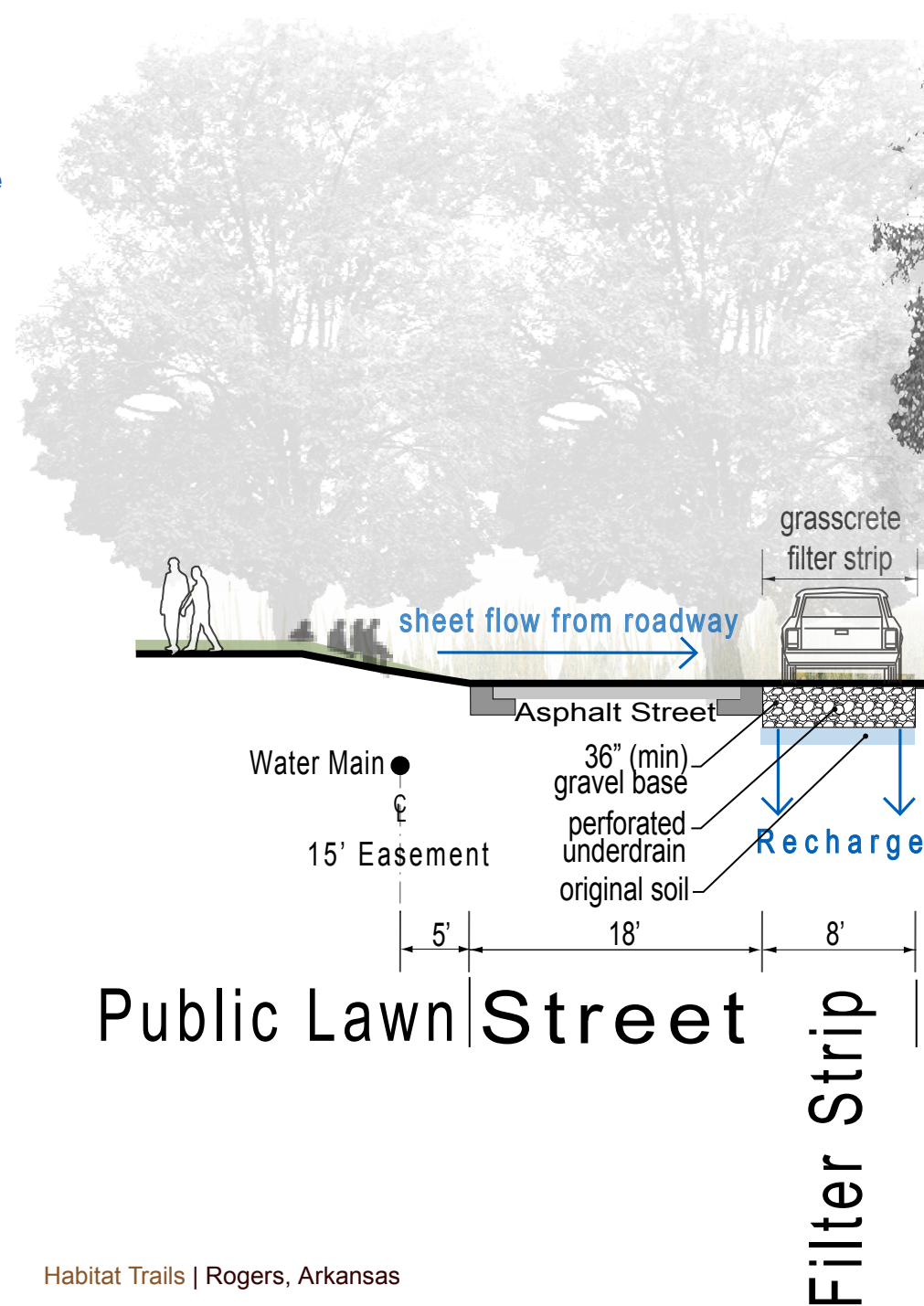
Conventional Pipe and Pond Development
40% pervious, 60% impervious

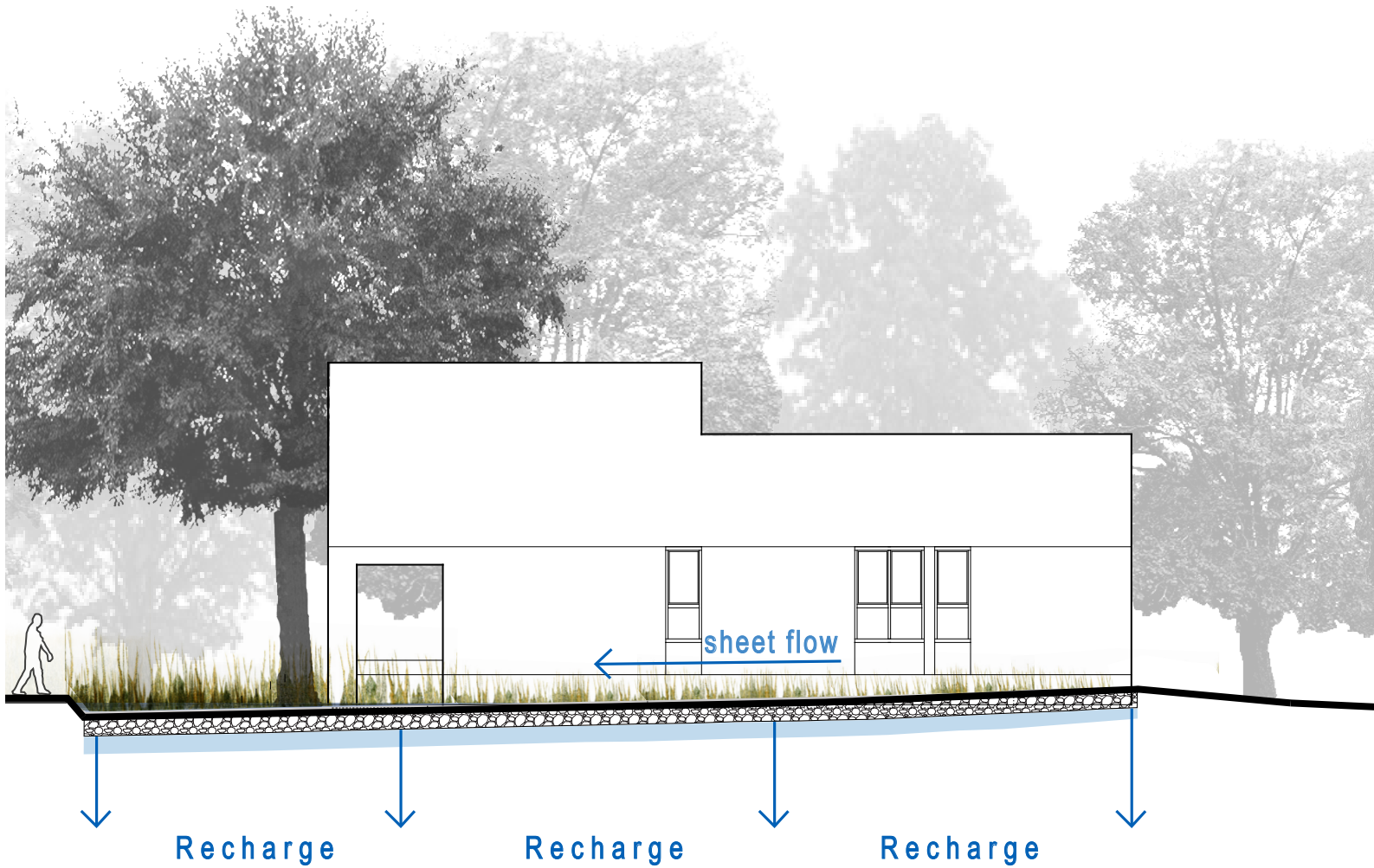
“research indicates that when impervious area in a watershed reaches 10 percent, stream ecosystems begin to show evidence of degradation, and coverage more than 30 percent is associated with severe, practically irreversible degradation.”

Green Streets: Innovative Solutions for Stormwater and Stream Crossings

hydrological
solution

Side Yard Development Code

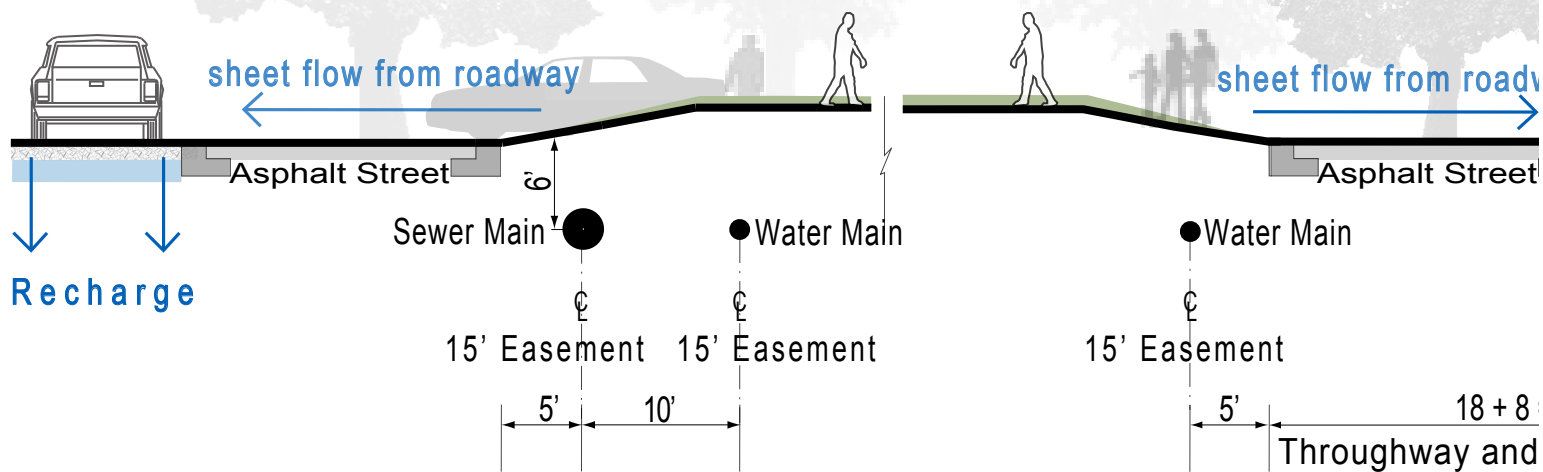




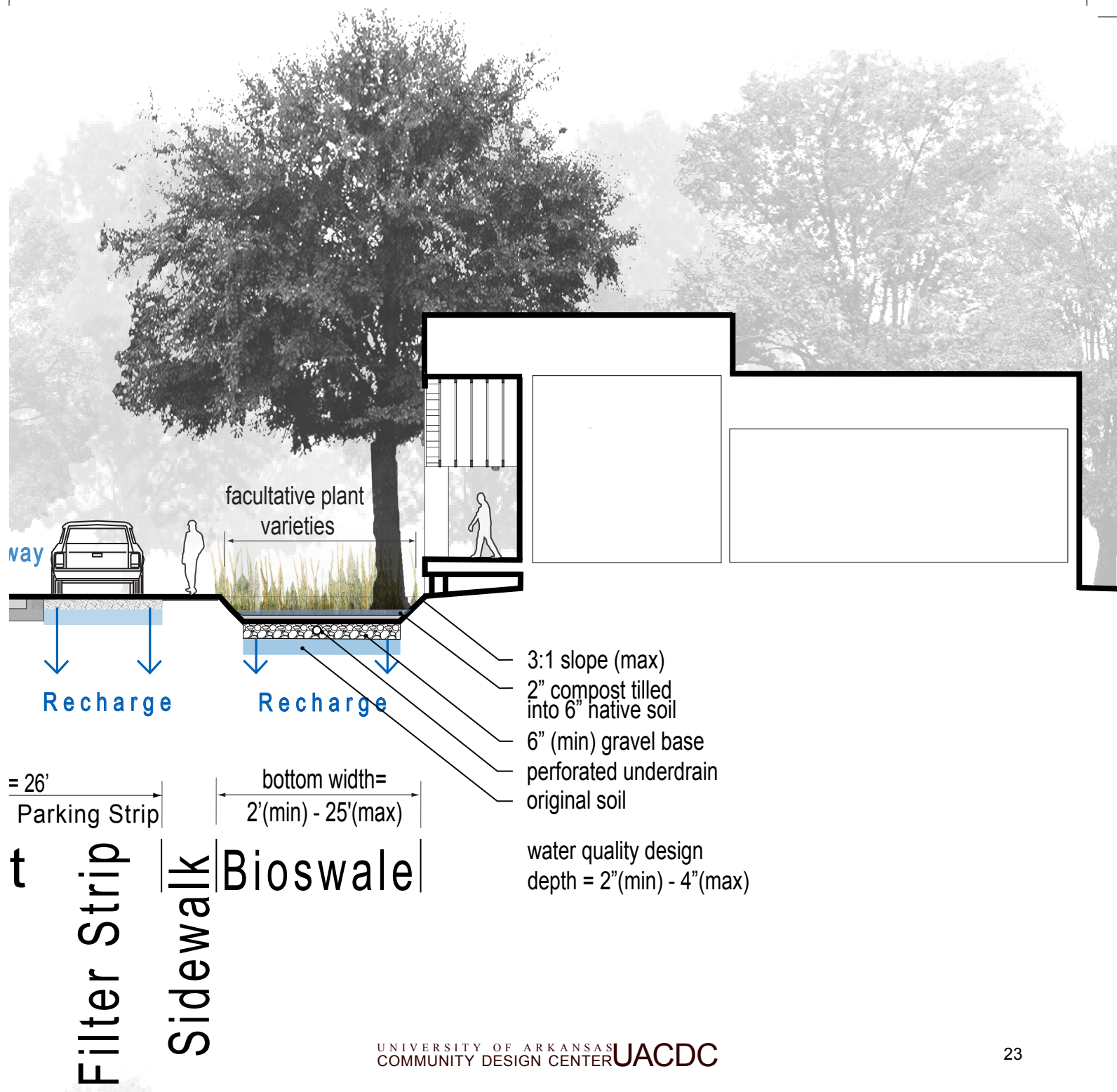
Sidewalk | Bioswale |

hydrological solution

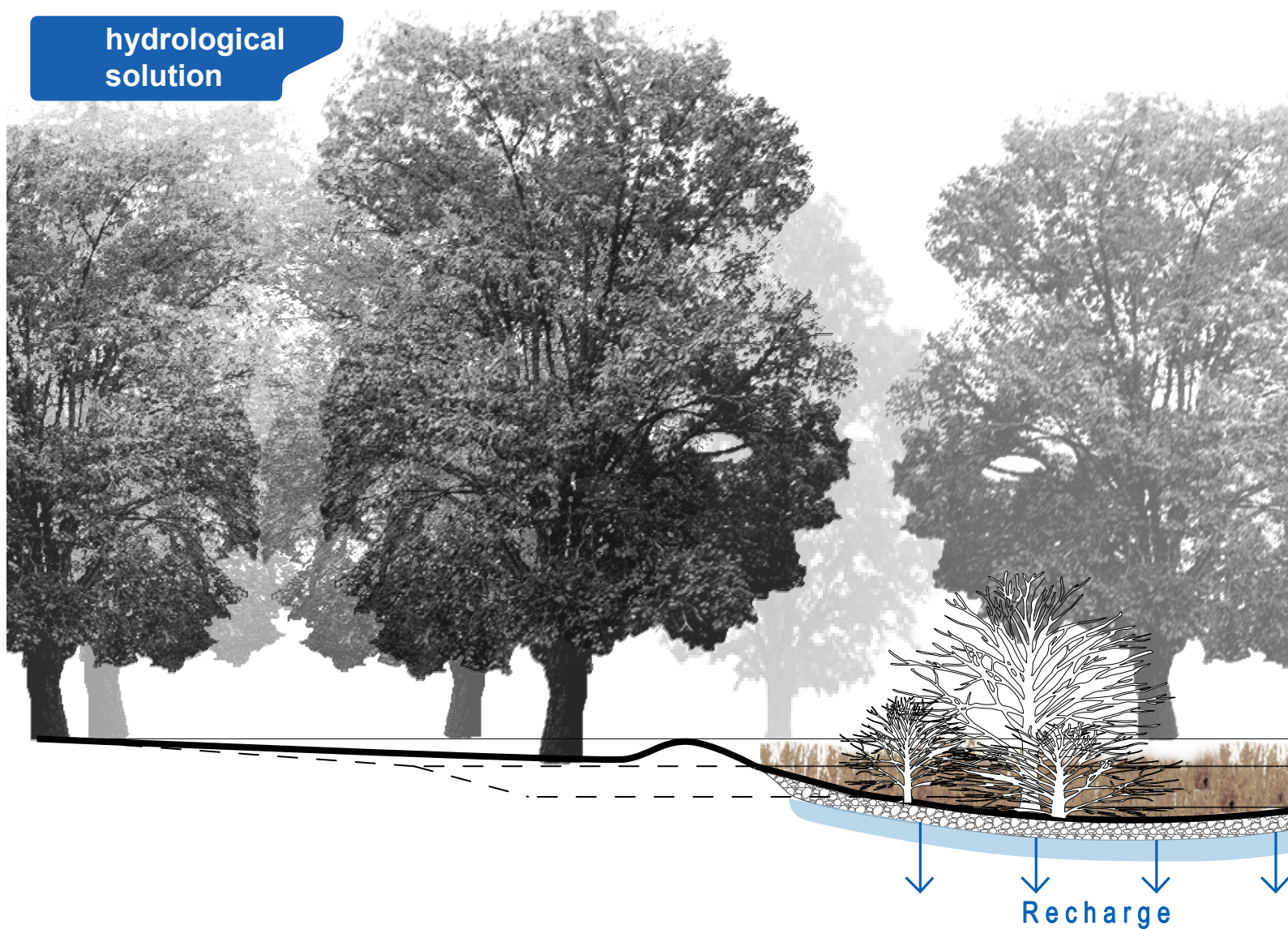
Green Street Development Code



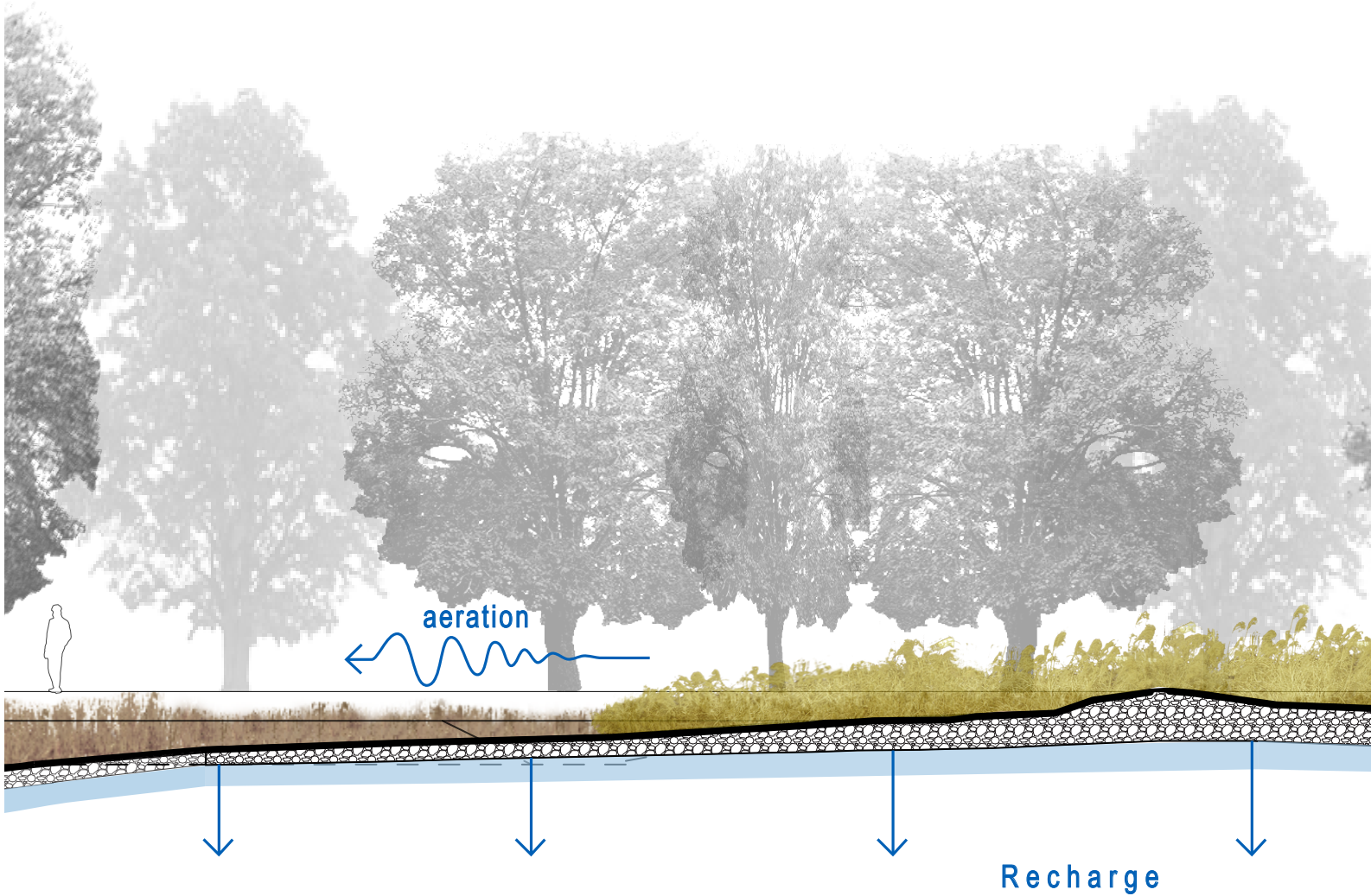
Street | Public Lawn | Street



hydrological
solution



|T r a i l|W e i r|B a s i n

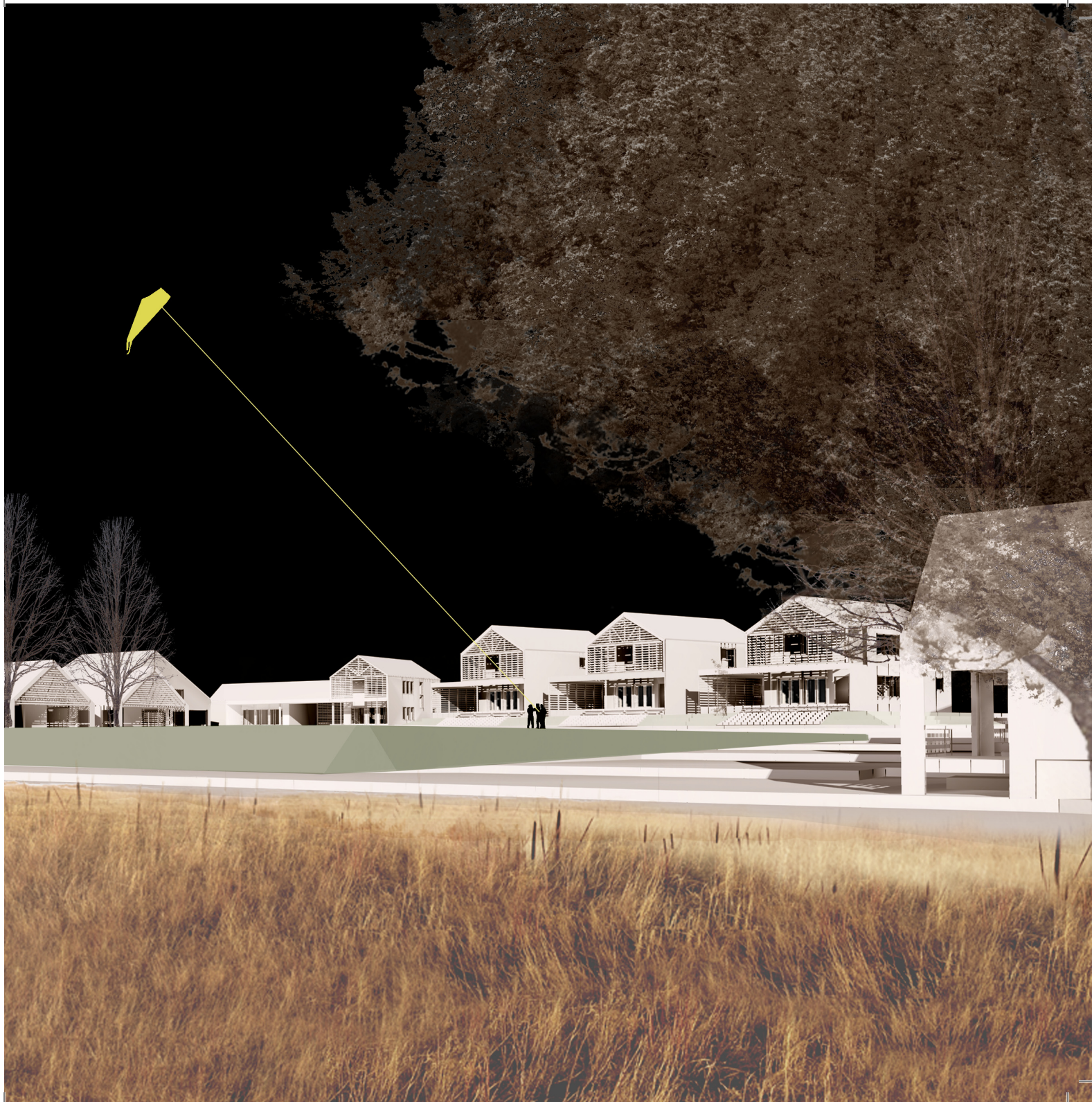


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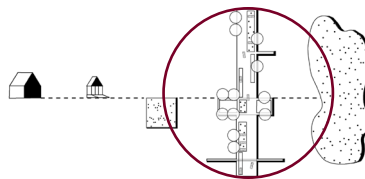
Habitat Island1

UNIVERSITY OF ARKANSAS
COMMUNITY DESIGN CENTER UACDC

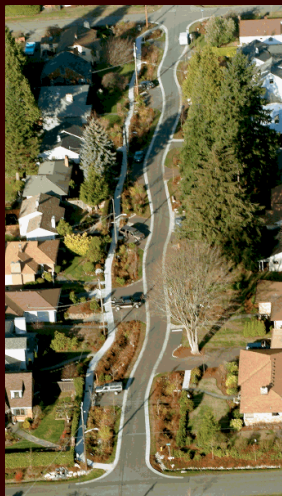




green streets solution



Green Streets are designed as landscapes to calm vehicular traffic and provide stormwater management functions.



Street Edge Alternatives
"S.E.A. Streets"

in Seattle, Washington are examples of stormwater gardens, infiltration strips and bioremediation swales integrated in the streetscape

<http://www.ci.seattle.wa.us/util/SEAstreets/default.htm>

"...the guiding principle for today's road design and planning has to be to conserve, protect and restore the environment as the first consideration. This can be a new and unfamiliar principle, with an unclear vision, to those who have perceived roads solely as a means of transportation."

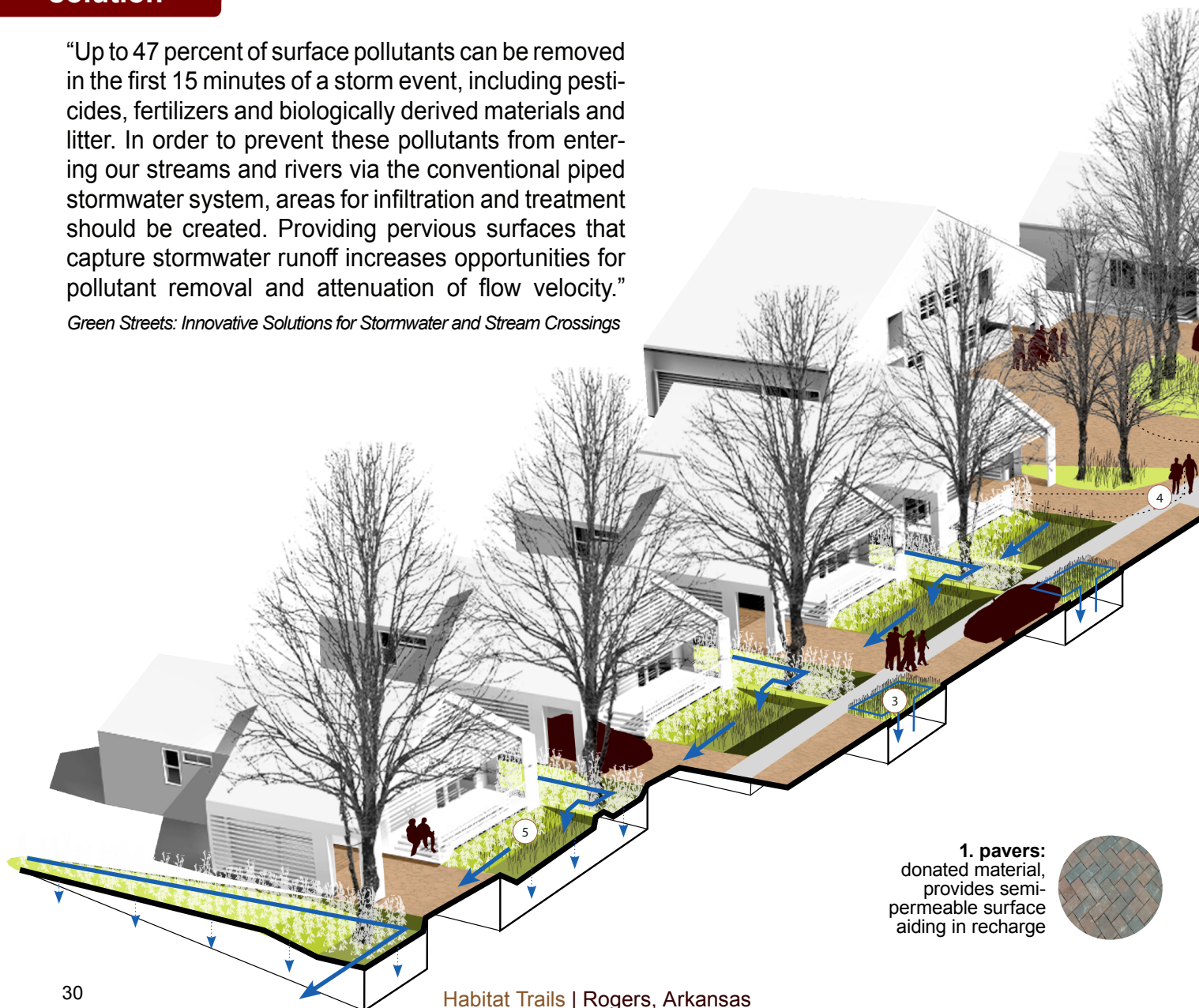
Green Streets: Innovative Solutions for Stormwater and Stream Crossings

- Stormwater bioswales eliminate the need for costly curb and gutter systems and reduce peak load effects during storms.
- Decentralization of stormwater facilities eliminates the use of large unsightly detention basins.
- Stormwater runoff is treated through bioremediation, locally removing suspended solids and pollutants. (Treated effluent is recharged, improving local groundwater quality.)
- Green streets significantly reduce the total pervious surface of the development; lessening the impact of polluted urban runoff and the urban heat-island effect.

green streets solution

“Up to 47 percent of surface pollutants can be removed in the first 15 minutes of a storm event, including pesticides, fertilizers and biologically derived materials and litter. In order to prevent these pollutants from entering our streams and rivers via the conventional piped stormwater system, areas for infiltration and treatment should be created. Providing pervious surfaces that capture stormwater runoff increases opportunities for pollutant removal and attenuation of flow velocity.”

Green Streets: Innovative Solutions for Stormwater and Stream Crossings





soft rush
juncus effusus



red cardinal flower
lobelia cardinalis



2. crushed brick:
by-product of brick
manufacturing process,
provides a permeable
surface which aids in
filtration of stormwater



**4. concrete and
asphalt:**
concrete used at
sidewalks, asphalt
used at roads,
asphalt is more
pervious than
concrete and is
used where current
codes will allow



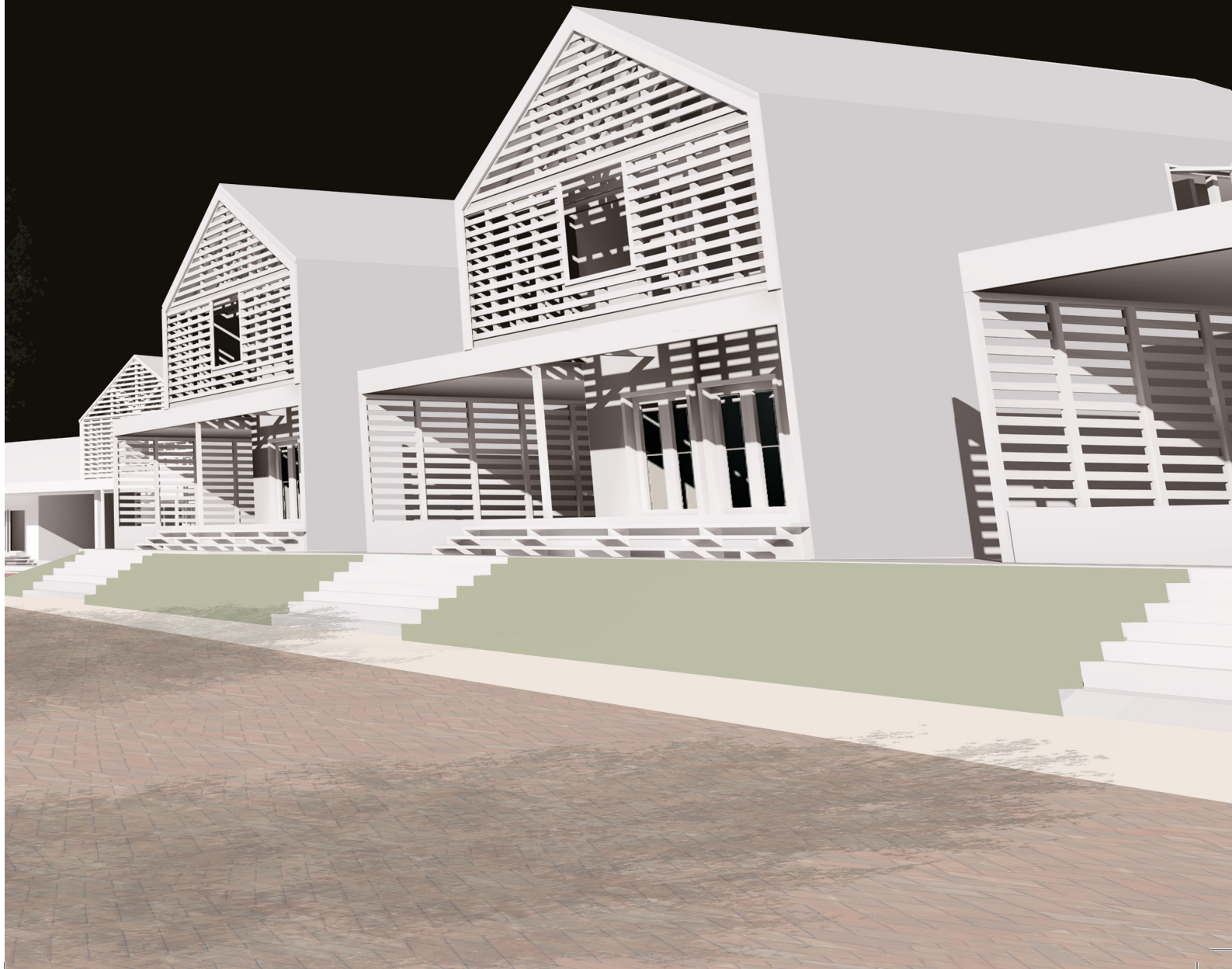
equisetum
equisetum variegatum



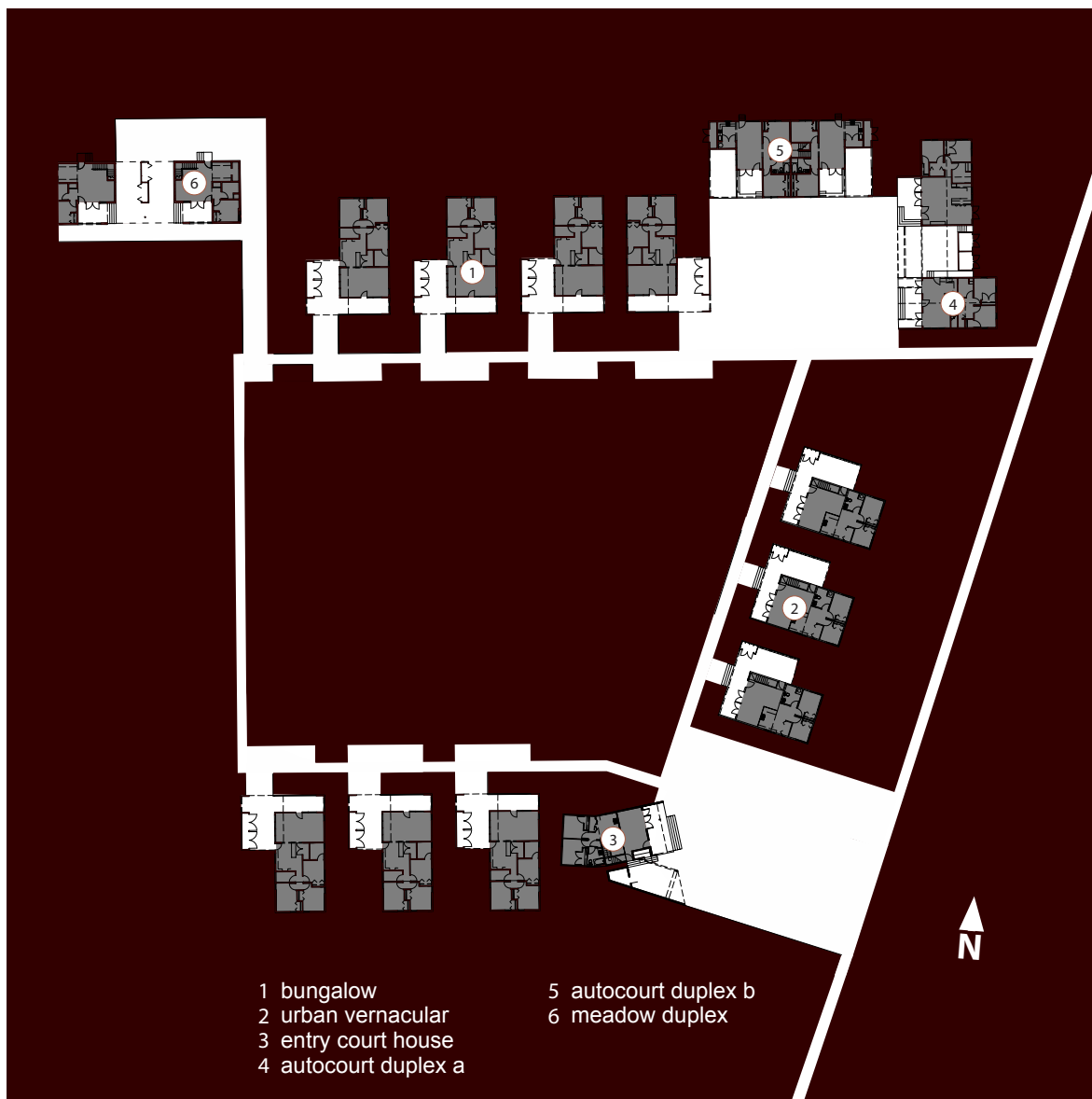
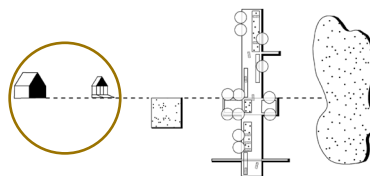
3. grasscrete:
permeable surface
with facultative
vegetation provides
sediment control and
recharge capacity

5. bioswales:
facultative vegetation aids in
phytoremediation and pollutant
removal—"right plant, right place"





housing typologies





Bungalow



Urban Vernacular

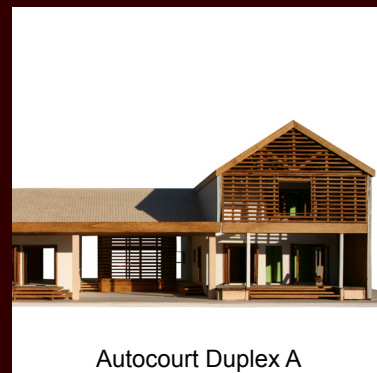


Entry Court House

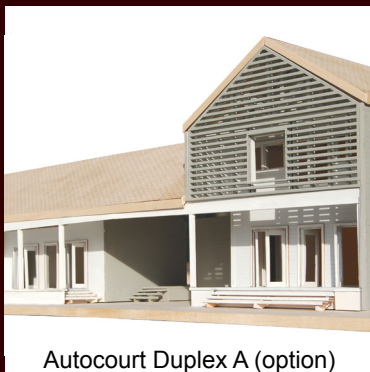


Entry Court House (option)

- Within Habitat's budget of \$55/sq ft and floor plan requirements
- Open-section living area combines porch and public space to amplify inhabitation scenarios
- Responsive to Habitat's corporate donor model, which relies on available surplus material
- Facilitates convective ventilation for energy conservation



Autocourt Duplex A



Autocourt Duplex A (option)

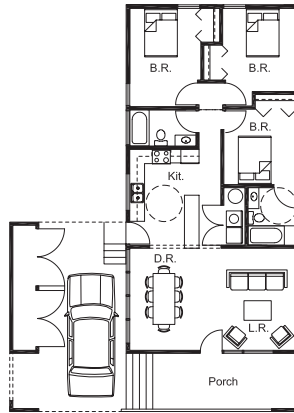


Autocourt Duplex B



Meadow Duplex

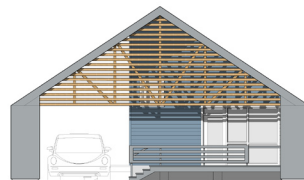
housing typologies



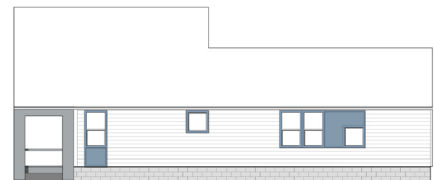
Floor Plan



Left Elevation



Front Elevation



Right Elevation



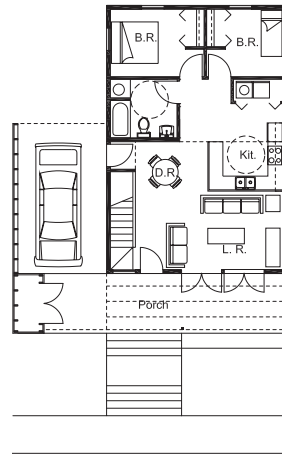
Bungalow

“with a weaving of fabric for dwelling - a weaving of people to places, houses to settings, indoors to outdoors - the discipline of architecture is reinserted into the suburban housing debate.”

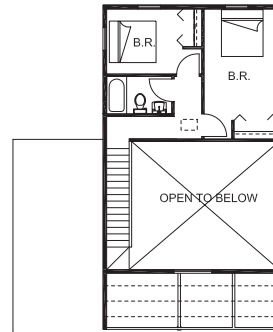
Renee Chow, *Suburban Space: The Fabric of Dwelling*



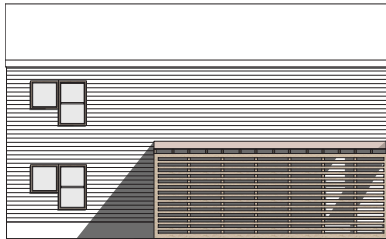
housing typologies



First Floor Plan



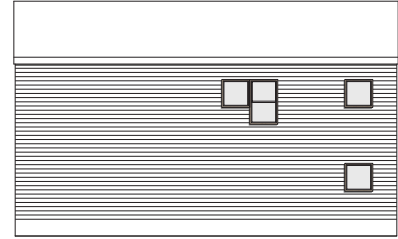
Second Floor Plan



Left Elevation



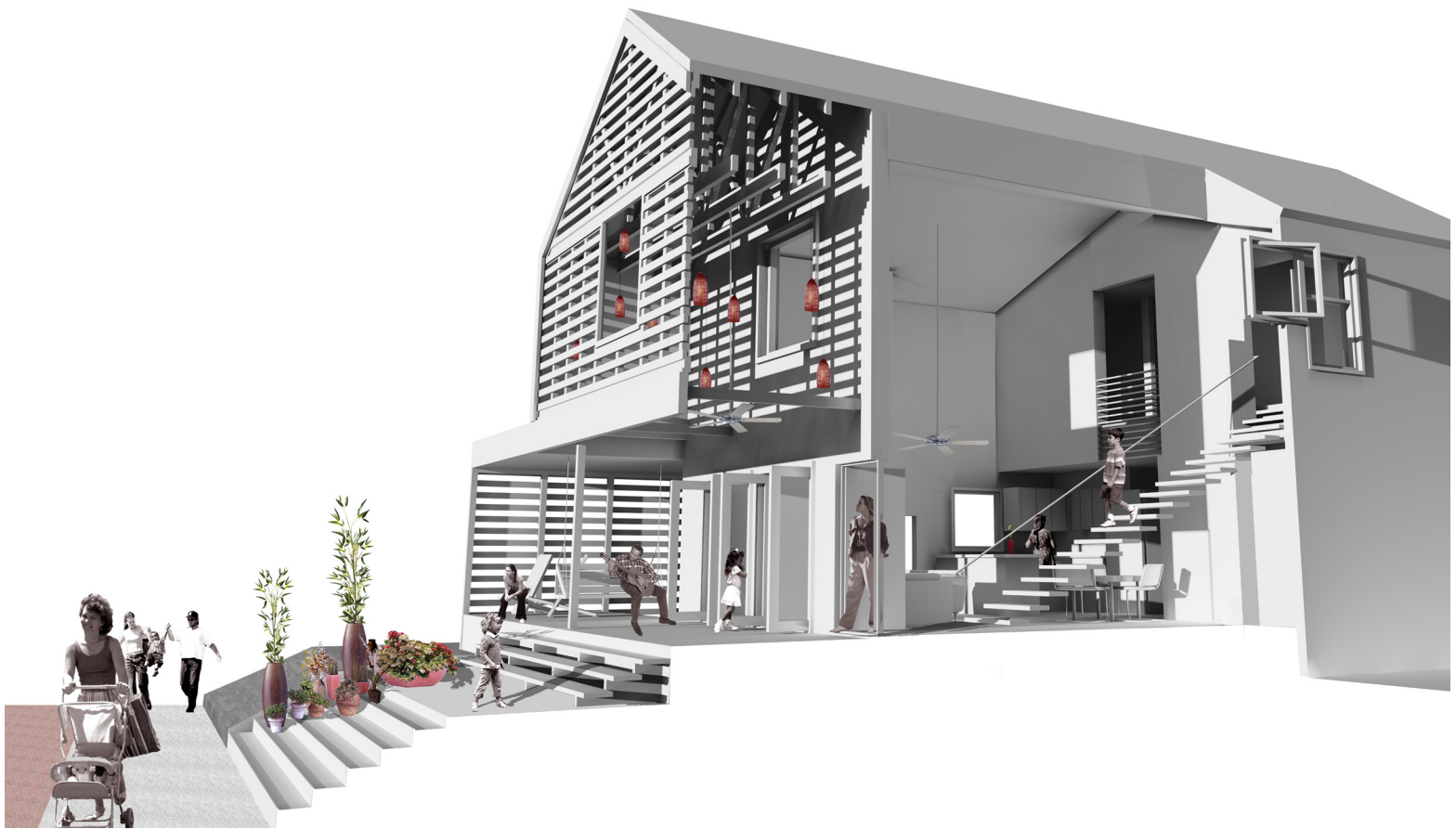
Front Elevation



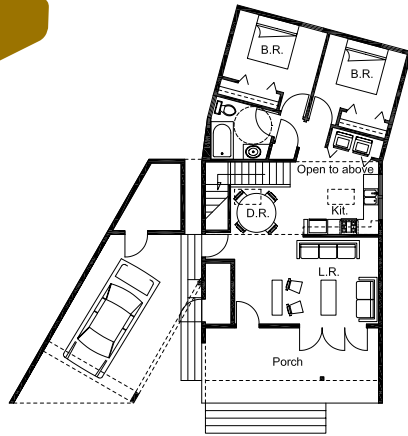
Right Elevation



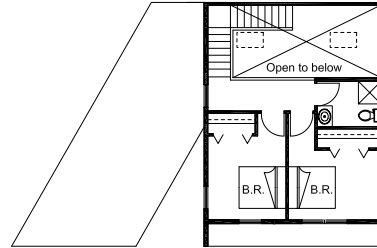
Urban Vernacular



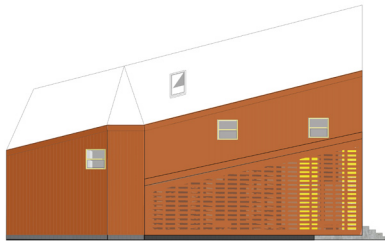
housing typologies



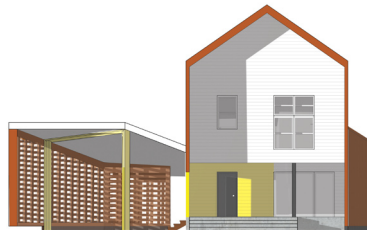
First Floor Plan



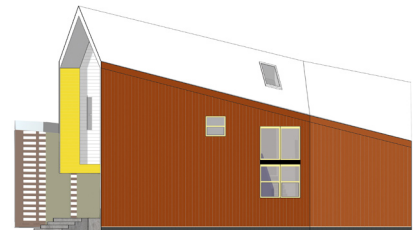
Second Floor Plan



Left Elevation



Front Elevation



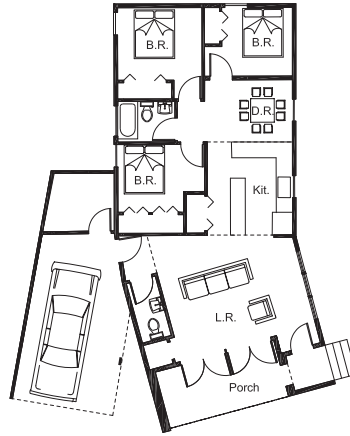
Right Elevation



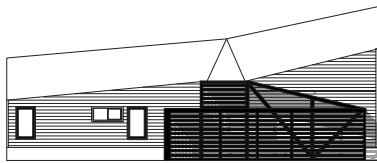
Entry Court House



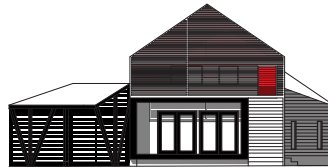
housing typologies



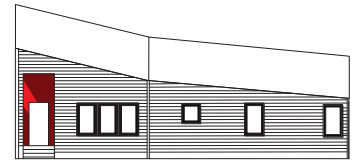
Floor Plan



Left Elevation



Front Elevation



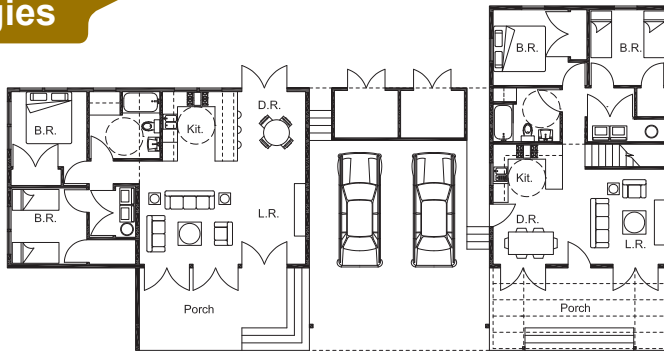
Right Elevation



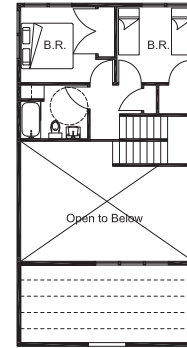
Entry Court House (Option)



housing typologies



First Floor Plan



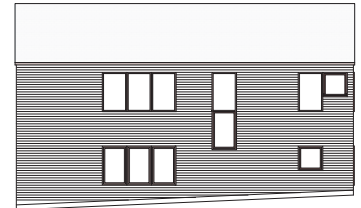
Second Floor Plan



Left Elevation



Front Elevation



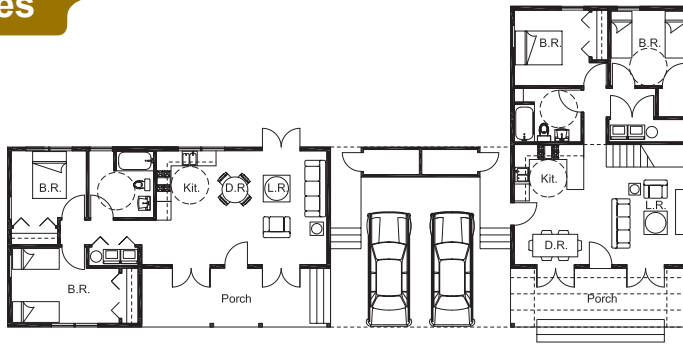
Right Elevation



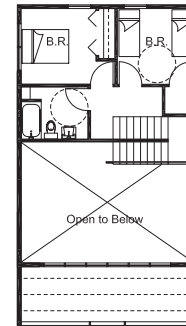
Autocourt Duplex A



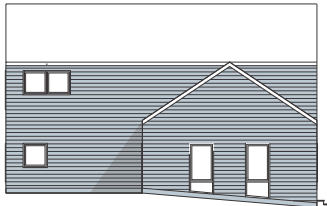
housing typologies



First Floor Plan



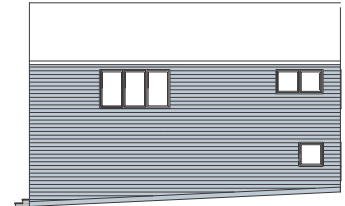
Second Floor Plan



Left Elevation



Front Elevation



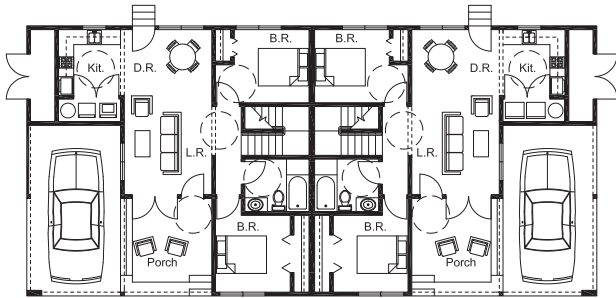
Right Elevation



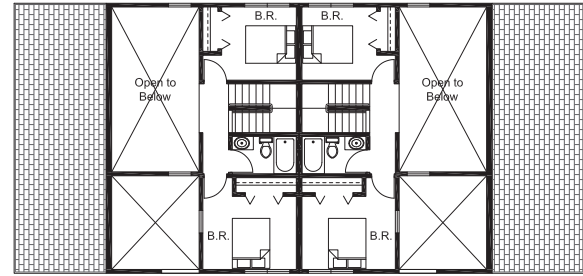
Autocourt Duplex A (Option)



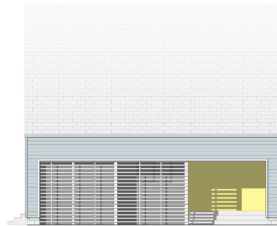
housing typologies



First Floor Plan



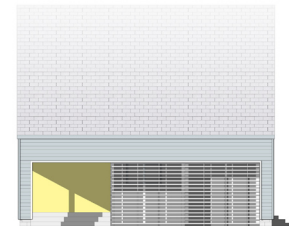
Second Floor Plan



Left Elevation



Front Elevation



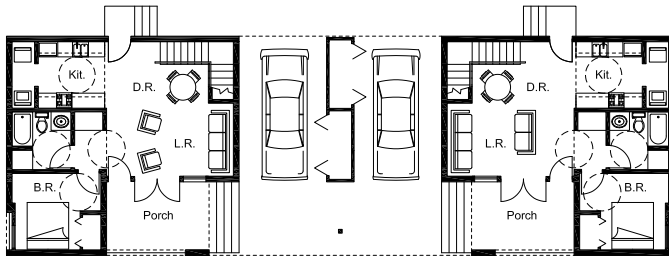
Right Elevation



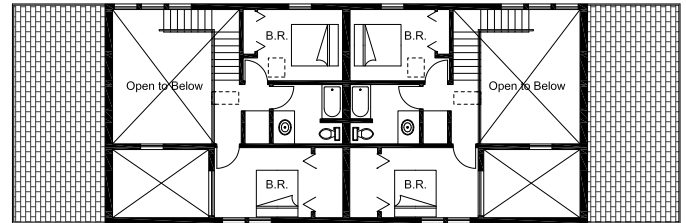
Autocourt Duplex B



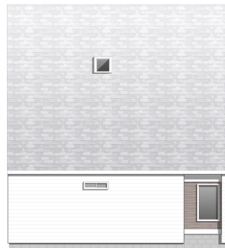
housing typologies



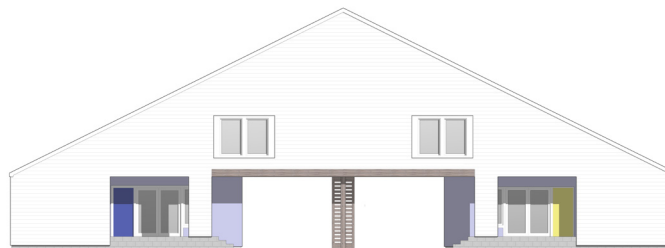
First Floor Plan



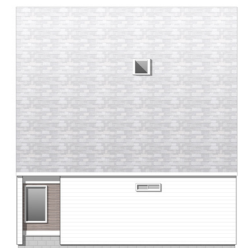
Second Floor Plan



Left Elevation



Front Elevation



Right Elevation



Meadow Duplex







MISSION	<p>The mission of the University of Arkansas Community Design Center is to advance creative development in Arkansas through education, research, and design solutions that enhance the physical environment.</p>
VISION	<p>As an outreach center of the School of Architecture, UACDC is developing a repertoire of new design methodologies applicable to community development issues in Arkansas, with currency at the national level.</p> <p>UACDC design solutions introduce a multiple bottom line, integrating social and environmental measures into economic development. Integrative design solutions add long-term value and offer collateral benefits related to sustained economic capacity, enhanced ecologies, and improved public health—the foundations of creative development.</p>
APPROACH	<p>Expanding the Consideration of Civic Space</p> <p>The contemporary public domain has shifted to an expanded urban field that includes suburban and other non-urban environments—a geography of sprawl. Compounded by the decline of traditional downtowns, this shift poses new planning challenges for which no adequate civic development models exist.</p> <p>Our planning approaches are tailored for historic downtowns, rural sites, watersheds, highway/rail infrastructure, the college campus, retail environments, and the office/residential/retail subdivision.</p> <p>Developing New Models of Design</p> <p>Through meta-disciplinary research and design principles, UACDC combines ecological, architectural, landscape architectural, and urban design solutions to address emerging planning challenges. Our research maps the unique economic, political, and cultural processes that have shaped the Arkansas landscape.</p> <p>Our work addresses new challenges in affordable housing, urban sprawl, environmental planning, and management of regional growth or decline.</p>
IMPACT	<p>UACDC was founded in 1995 and has provided design and planning services to over 30 communities across Arkansas. Our planning has helped Arkansas communities to secure nearly \$64 million in grant funding to enact suggested improvements.</p>

**Arkansas Natural
Resources Commission**



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